Effect of dried Laminaria japonica entrapped allyl isothiocyanate in inhibiting foodborne pathogen

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Allyl isothiocyanate (AITC), a naturally occurring antimicrobial compound, is an effective inhibitor of various pathogens, but its use in the food industry is limited by its volatility and pungency. The objective of this study was to overcome the volatility of AITC using dried Laminaria japonica as its carrier. The powder of L. japonica was prepared with different particle size; 500 μm, 710 μm and 900 μm. AITC loading into raw and deoiled L. japonica powder was achieved using two different systems, vapor adsorption and complexation. Vapor adsorption was carried out by heating small tube containing 10 ml liquid AITC inside a sealed larger vial containing 5 g powder sample at 65 °C. Complexation of AITC with L. japonica powder was conducted by adding the powder sample directly into AITC solution at constant temperature (25 °C). The study of AITC adsorption and desorption was determined by monitoring sample weight changing with time. The quantification of AITC was analyzed by gas chromatography (GC). AITC present in L. japonica powder was studied by FTIR spectroscopy. Antimicrobial tests were made against 4 microorganisms: Bacillus cereus, Staphylococcus aureus, Escherichia coli and Salmonella typhimurium.